

IN THE CLAIMS:

1. (Currently Amended) A pressure-balanced battery disposed within an insert positioned within a downhole tool, the battery being for powering downhole drilling components in a subterranean environment, the pressure-balanced battery comprising: a battery; and a housing enclosing and sealing a volume containing the battery, the housing being expandable and contractible to balance pressure internal to the housing with pressure external to the housing, housing, and the insert comprising an inside diameter adapted for passage of drilling fluids; the battery being disposed within a recess formed in an annular wall of the insert, and at least one aperture formed in the inside diameter leading to the recess; the apertures being adapted to allow the drilling fluid to pressurize the batteries disposed within the recess.
2. (Original) The pressure-balanced battery of claim 1, wherein the housing is in operable communication with downhole fluids.
3. (Original) The pressure-balanced battery of claim 1, wherein the housing is integrated into the annular structure of a downhole tool.
4. (Original) The pressure-balanced battery of claim 1, wherein at least a portion of the housing is at least one of machined, milled, cast, and forged into a downhole tool.

5. (Original) The pressure-balanced battery of claim 1, wherein the battery comprises a plurality of cells electrically connected in at least one of series, parallel, and a combination thereof, within the housing.

6. (Original) The pressure-balanced battery of claim 1, further comprising at least one battery terminal, connected to the battery, accessible through an opening in the housing.

7. (Original) The pressure-balanced battery of claim 1, wherein the battery comprises an electrolyte selected from the group consisting of a fluid electrolyte and a solid electrolyte.

8. (Original) The pressure-balanced battery of claim 1, wherein the battery is a fuel cell.

9. (Original) The pressure-balanced battery of claim 1, wherein the battery further comprises a plurality of components held together by a flexible casing, wherein the shape of the flexible casing is selected from the group consisting of a substantially planar shape, a substantially cylindrical shape, and a substantially semi-cylindrical shape.

10. (Original) The pressure-balanced battery of claim 1, wherein the battery is installed into at least one recess formed in the wall of a downhole tool.

11. (Original) The pressure-balanced battery of claim 1, wherein the battery is in operable communication with at least one of the group consisting of a downhole network, other downhole tools, and transmission elements configured to transmit information between downhole tools.

12. (Original) The pressure-balanced battery of claim 1, further comprising a signal-conditioning module to modify characteristics of power output from the battery.

13. (Original) The pressure-balanced battery of claim 1, wherein the battery is rechargeable.

14. (Currently Amended) A pressure-balanced battery disposed within an insert positioned within a downhole tool, the battery being for powering downhole drilling components in a subterranean environment, the pressure-balanced battery comprising: a battery; and a housing enclosing and sealing a volume containing the battery, the housing comprising: a substantially rigid portion; a resilient portion deformable to vary the volume of the housing, the resilient portion balancing pressure internal to the housing with ambient pressure external to the housing; and the insert comprising an inside diameter adapted for passage of drilling fluids; the battery being disposed within a recess formed in an annular wall of the insert, and at least one aperture formed in the inside diameter leading to the recess; the apertures being adapted to allow the drilling fluid to pressurize the batteries disposed within the recess.

15. (Original) The pressure-balanced battery of claim 14, wherein the resilient portion is in operable communication with downhole fluids.

16. (Original) The pressure-balanced battery of claim 14, wherein the housing is integrated into the annular structure of a downhole tool.

17. (Original) The pressure-balanced battery of claim 14, wherein the rigid portion is at least one of machined, milled, cast, and forged into the structure of a downhole tool.

18. (Original) The pressure-balanced battery of claim 14, wherein the battery comprises a plurality of cells electrically connected in at least one of series, parallel, and a combination thereof, within the housing.

19. (Previously Amended) The pressure-balanced battery of claim 14, further comprising at least one battery terminal, operably connected to the battery, accessible through an opening in the housing.

20. (Currently Amended) A method for providing power to downhole drilling components in a subterranean environment, the method comprising: providing a battery disposed within an insert positioned within a downhole tool, the insert comprising an inside diameter adapted for passage of drilling fluids; the battery being disposed within a recess formed in an annular wall of the insert, and at least one aperture formed in the inside diameter leading to the recess; the apertures being adapted to allow the drilling fluid to pressurize the batteries disposed within the recess; providing a housing enclosing and sealing a volume containing the battery, the sealed housing having a resilient portion flexible to vary the volume within the housing; and flexing the resilient portion to balance pressure internal to the housing with pressure external to the housing.

21. (Original) The method of claim 20, wherein flexing is actuated by communication between downhole fluids and the resilient portion of the housing.